



Физико-технический
институт
ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

**VIII Международная научно-практическая конференция
«Физико-технические проблемы в науке, промышленности и медицине»
Секция 4. Физико-химические и изотопные технологии в науке,
промышленности и медицине**

FEATURES AND BENEFITS OF TITANIUM AS A METAL FOR HUMAN IMPLANTS

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Titanium is found in the middle of the periodic table. The periodic table is a chart showing how chemical elements are related to one another. Titanium, a transition metal, is part of Group 4.

Titanium was one of the first elements discovered by modern chemists. The "modern" chemistry period began after the middle of the eighteenth century. It was the first time when the basic concepts of modern chemistry were developed. Titanium was discovered by an English clergyman William Gregor (1761-1817). Gregor studied minerals as a hobby. He did not think of himself as a chemist, but his research led to the discovery of titanium.

Titanium and its compounds have become very important in modern society. The metal is widely used in a variety of alloys. An alloy is made by melting and mixing two or more metals. It is often said that titanium is a surgical metal.

- Titanium is a unique material because of its high corrosion resistance.
- A distinctive feature of using titanium is not only in its strength, but also in its ability to grow together with the bone.

Indeed, there are titanium alloys used for making various bone implants in surgical practice. Human body is very tolerant to titanium alloys. They are resistant to corrosion in aggressive environment of a human body. On their surface there is an oxide film that prevents implant ion from penetrating into the body. Tissues around such implants do not change.

The advantages of titanium alloys are as follows:

- Titanium alloys are very strong, able to withstand heavy loads;
- They are more durable than chrome, nickel and stainless steel;
- During sterilizing medical instruments by alcohol, burning, formalin, the surface of titanium alloys is not destroyed;
- Titanium alloys do not cause allergies.

Having analyzed the material of titanium, it becomes evident that titanium is really perfect for using it as implants. It has proved extremely popular in medicine all over the world. This metal of "present and future" will soon replace other materials used in this sphere.

REFERENCES

1. Glinka N. L. (1985). General Chemistry. Textbook for universities. London. p.704.
2. Petranov I. V. (1983). Popular Library of chemical elements. [Hydrogen-palladium], Moscow: NAUKA, p.576
3. Zubkov L. B. (1987). Space metal [All about titanium]. Moscow: Science. p.128